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## Scrapie: Ovine Slaughter Surveillance — Phase I

### Overview

The overall objective of the Scrapie: Ovine Slaughter Surveillance (SOSS) study is to estimate the national and regional prevalence of scrapie in mature cull sheep entering slaughter channels. The study was initiated at the request of members of the sheep industry, who wanted to accelerate eradication of the disease.

Beginning in February 2001 and ending in March 2002, Phase I included the study design, methods development, and sample-collection training. The objective of Phase I was to develop and modify the sample collection and testing processes, without emphasizing statistical results.

Phase II, which is the actual prevalence study, started April 1, 2002, and will continue for approximately 1 year. The number of samples to be collected from each participating plant on a weekly or bi-weekly basis was determined based on the number of cull ewes killed at the plant in 2001. Phase III will evaluate and analyze data received during Phase II. Phase III results will be published in fall 2003.

### Phase I Methods

The slaughter plants selected to participate in SOSS Phase I were identified based on historical slaughter data obtained through the Food Safety and Inspection Service and the National Agricultural Statistics Service. Since the currently accepted diagnostics are for adult animals, plants that slaughtered large numbers of mature cull ewes were targeted for the SOSS study.

Coordinators and sample collectors were selected for each State with a participating plant. Coordinators served as primary contacts in their States and were responsible for ensuring that the correct number of quality samples were submitted, supplies were ordered and provided to collection personnel, and information was disseminated as needed. Sample collectors were responsible for the actual collection of tissues at the slaughter plants.

Training the sample collectors was a critical component of SOSS Phase I and was accomplished via hands-on instruction and a Procedures Manual that identified the specific anatomical locations of the needed tissues. As the study progressed, regular field reports were produced to inform collectors of the quality of their submitted samples.

Established goals for submitting proper tissue in desirable condition were defined and met prior to Phase II of the study.

Diagnostic laboratories were contracted by the National Veterinary Services Laboratory (NVSL). Three contract labs were used for Phase I. Before SOSS tissues were submitted, laboratory personnel were trained and the labs were approved by NVSL.

To remain consistent with Phase I objectives, convenience sampling, which is sampling at will and without regard to randomness, was used for all samples taken during Phase I.

A standard kit was used that included tools and materials to collect, package, and ship the needed tissues to NVSL.

Samples were collected from the brainstem (obex), cerebellum, both tonsils, both retropharyngeal lymph nodes, and the lymphoid tissue of the third eyelid.

At the time of tissue collection, data regarding each head were recorded on a submission form. These data included a unique sample number, animal identification, face color, and age of the animal based on the number and condition of permanent teeth. Ear tags and plant or market records (when available), and the Veterinary Services generic data base were used to determine the region of animal origin.

### Phase I Findings

SOSS Phase I was a "pilot" project. Samples were not collected with the intention of performing rigorous statistical analysis. Therefore, results shown below do not reflect the U.S. cull ewe population.



Tissue samples were collected from 1,159 cull ewes in 23 slaughter plants from 13 States.

Sheep Face Color	Number	Percent
White	648	55.9
Black	318	27.4
Mottled	143	12.4
Not recorded	50	4.3
Total	1,159	100.0

Age of Sheep	Number	Percent
1 year	54	4.7
2 years	127	10.9
3 years	201	17.3
4 years	407	35.1
5 years or older	338	29.2
Not recorded	32	2.8
Total	1,159	100.0

Tissues were tested using the immunohistochemistry technique (IHC).

Tissue Test Result (IHC)	Obex	Tonsil	Lymph Node
Negative	1,079	939	1,139
Positive	2	2	2
Untestable	78	218	18
Total	1,159	1,159	1,159

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Genotype results were obtained for 611 of the 1,159 samples.

Genotype Results	Number	Percent
QQ	237	20.4
QR	279	24.1
RR	95	8.2
XX (not testable)	44	3.8
Not tested	504	43.5
Total	1,159	100.0

Two animals out of the 1,159 tested were positive for scrapie. In these animals, all three tissues (obex, tonsil, and lymph node) tested positive. Both were 4-year-old ewes and were QQ genotypes. One was white -faced, the other black-faced. Neither sample could be identified back to the region of origin.

## Lessons Learned

Phase I allowed for the development of plant relations, modification of forms, and the fine-tuning of tissue collection protocols before the implementation of the full study in April of 2002.

Since approximately two-thirds of all mature cull ewes are exported to Mexico annually, a livestock market sampling protocol was developed for Phase II that calls for the sampling of sheep that are typically exported to Mexico and not sent to domestic slaughter plants.

An instructional CD-ROM containing video clips, color pictures, and the SOSS instruction manual was developed and distributed for Phase II. By the time Phase II began, proficiency (percent testable tissues) for each tissue type was at least 80 percent.

Collecting third eyelid tissue from dead animals was extremely difficult and was stopped a few months into Phase I.

Additional diagnostic laboratories were contracted by NVSL to assist with the increased workload during Phase II.

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